

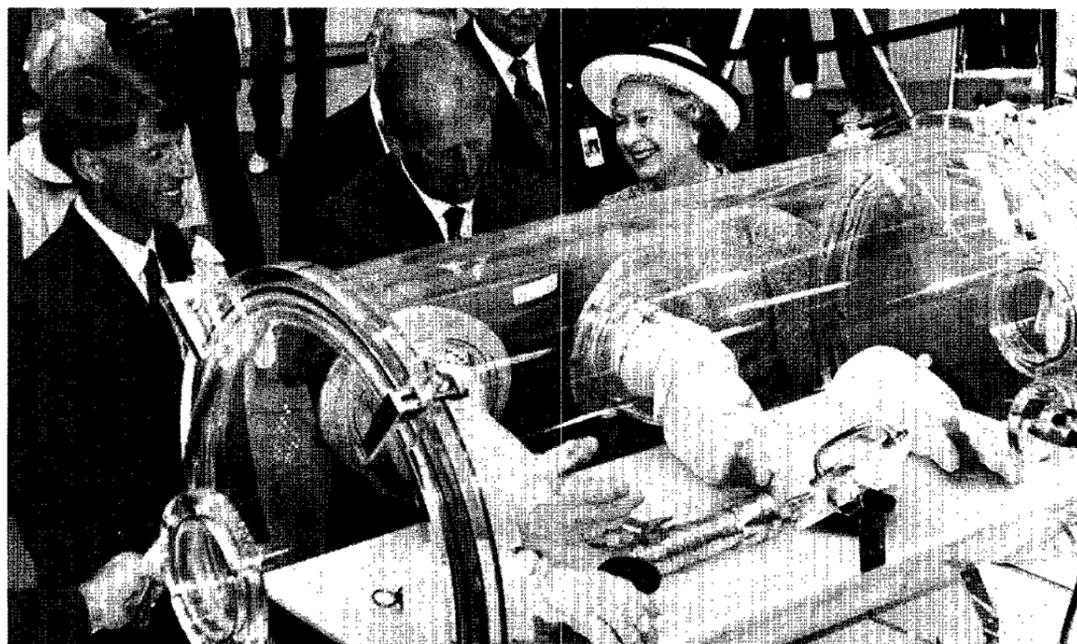


# Space News Roundup

Vol. 30

May 24, 1991

No. 21



JSC Photo by Benny Benavides

Prince Philip tries his hand at maneuvering items with EVA gloves while Queen Elizabeth watches during the royal couple's tour of JSC Wednesday

## JSC gives royal treatment to England's Elizabeth II

By Kari Fluegel

When Louise Kitchen presented Queen Elizabeth II a bouquet of yellow roses as the royal entourage entered Bldg. 30, there was a bit of *deja vu*.

Kitchen, now a senior systems analyst at Unisys, had given a similar presentation to then-Princess Elizabeth 43 years ago when the young monarch was touring with her father, King George.

Kitchen said it is a custom to present flowers to the queen.

"I'm glad I did it," Kitchen said.

"(Her Majesty) really loved it."

Queen Elizabeth II and Prince Philip, Duke of Edinburgh, visited JSC for about three hours Wednesday for a luncheon, demonstrations and tour of the Mission Control Center.

"We wanted to show Her Majesty some different aspects of Houston," said Houston Mayor Kathy Whitmire during the luncheon in Bldg. 9A. "We wanted her to see a little bit of the arts and culture and the ethnic diversity of our community. We wanted her to

know about the medical advances in our city. And then of course we wanted her to know that Houston is still space city. We are very, very proud of the fact that the Johnson Space Center is in our community and is moving us forward with the development of the space station."

JSC Director Aaron Cohen presented the queen a plaque with miniature English and United States flags flown on STS-37 in April. The plaque also carries a

Please see **QUEEN**, Page 4

## STS-40 count to start again after repairs

By Kyle Herring

Workers at Kennedy Space Center's pad 39B are working around the clock to get *Columbia* ready for a launch attempt June 1 after problems surfaced Tuesday morning halting the countdown at the T-minus-11-hour mark.

The launch countdown was recycled and is scheduled to begin Tuesday afternoon for a June 1 launch attempt at 7 a.m. CDT.

The delay in launching *Columbia* on the STS-40 Spacelab Life Sciences-1 mission was caused by three separate issues: a suspect interface between the orbiter's computers and electronics called a multiplexer-demultiplexer; a faulty general purpose computer; and a concern about temperature sensors in the main propulsion system near the main engines.

The concern regarding the sensors was brought forward after testing revealed a crack in a sensor removed from *Columbia* late last year. As a precaution, all nine temperature sensors were removed and replaced with newer sensors.

The problem with one of 23 MDMs on the vehicle surfaced early Tuesday morning when workers detected a failure of that unit. This particular unit controls functions for the solid rocket booster

and orbiter hydraulics, ordnance systems and the orbital maneuvering system/ reaction control system functions.

The MDM did begin operating normally later, but managers elected to change the unit to ensure full redundancy of the system for the mission.

Later Tuesday morning, one of the five GPCs, running in the "redundant set" — at the same time

as the other four computers — was "voted" out of the set when the others detected a problem with the computer.

Changing the computer is about a four-hour operation and can be performed in parallel with other turnaround work aboard *Columbia*.

Changing the MDM and the temperature sensors requires access to the aft compartment of the orbiter and takes five to seven days.

All the components must be retested to verify proper operation before launch.

Meanwhile, workers are inspecting the temperature sensors on *Discovery*, which flew the last mission. Preliminary inspections showed that two sensors have potential cracks. Since weld lines can be mistaken for cracks, managers are conducting more extensive X-ray analysis of the sensors on *Discovery*.



## Ground breaking to blast off Space Center Houston construction

Apollo-era lunar shovels will dive into the dirt once again, this time breaking ground for Space Center Houston, JSC's new \$70 million visitor center.

Wielding the shovels at the Tuesday festivities will be a host of Texas politicians including Houston Mayor Kathy Whitmire, Harris County Judge Jon Lindsay, U.S. Senators Lloyd Bentsen and Phil Gramm, and Congressmen Jack Brooks and Mike Andrews.

Bentsen and Gramm will deliver keynote addresses, and Whitmire, Lindsay, Brooks and Andrews will

make additional remarks at the ceremony.

Presentations by Harold Stall, president of the Manned Space Flight Education Foundation, Inc., developers of the new visitors center; Aaron Cohen, JSC director; and Coleman Moore, president of the Clear Lake Area Chamber of Commerce, will round out the event.

First ground will be broken by lunar shovels used by Apollo-era astronauts for geology training to prepare of the lunar surface excursions.

"You can expect the excitement to build during the ceremony," said

Vance Ablott, general manager of Space Center Houston. "A giant countdown clock and mission commentator Steve Nesbitt will control the time the first dirt lifts off for the project. A lot of red, white and blue and patriotic music and dancing will lead us to the climax of the program."

Although the formal ground breaking ceremony begins at 11 a.m., the musical portion of the event starts at 10:15 p.m. with a 25-piece orchestra.

Employees who can be spared from their duties are encouraged to attend. The public is invited, and the foundation has issued more than 500

special invitations to individuals who have made contributions to Space Center Houston.

Ward and Ames Special Events and L.D. Systems will handle the production of the program titled "Operation Countdown" which includes a 150-voice choir, a multi-ethnic dance troop and special effects.

Space Center Houston, located just inside JSC's main gate, is expected to open in the fall of 1992. The new 183,000-square-foot facility will include several major elements: the Mission Status Center where visitors

learn what is happening at NASA that day; the Starship Gallery depicting the history and future of space through artifacts, mockups and films; the Feel of Space where visitors will experience the challenges of space travel; Space Center Theater showing "To Be An Astronaut" on an 80-foot wide, five-story screen; and a space shuttle mockup.

Also, once the center is open, visitors can participate in a guided tram tour of JSC and special programs in the lobby of Space Center Plaza. Restaurants and gift shops also will be available.

## New 'people mover' debuts

Crew Transport Vehicle designed to improve egress

A new transport vehicle, designed to improve egress for shuttle crew members after space flight, will be introduced to the landing operations when the STS-40 crew returns from its nine-day flight.

The new Crew Transport Vehicle joins the landing convoy to permit safer, more efficient crew egress and will facilitate medical investigations that take place immediately after landing.

The CTV is a renovated "people mover" acquired from the Baltimore/Washington International Airport earlier this year. "People-movers" are used at large airports worldwide to transport passengers from the terminal to the aircraft. These vehicles can be raised or lowered by lifts from a floor height of 5 feet 9 inches to a maximum of 18 feet 4 inches for convenience in loading and unloading passengers.

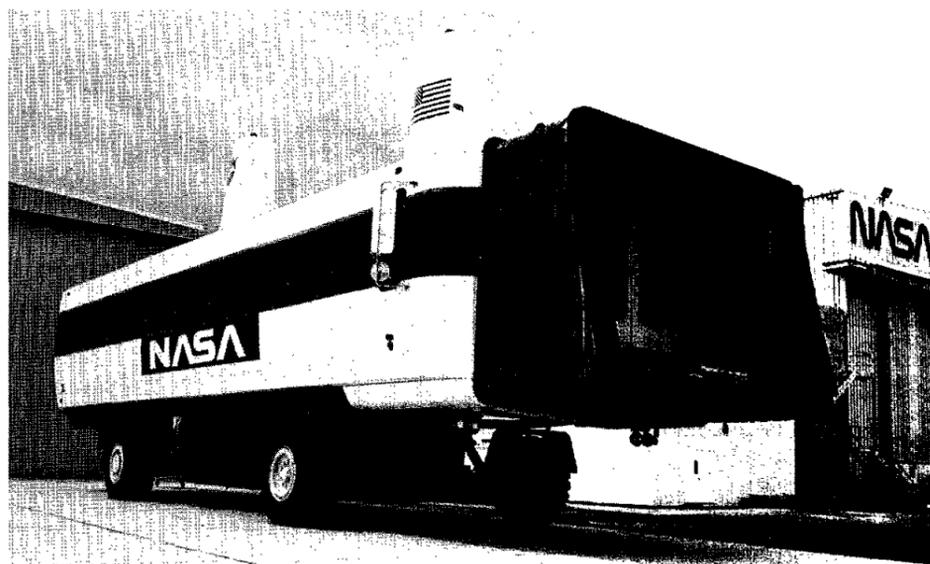
NASA will use the new CTV to allow the

crew efficient egress after shuttle flights to facilitate landing investigations and to ferry crew members from the orbiter after landing, said Travis Brown, manager of flight projects for JSC's Medical Sciences Division.

As after past landings, the convoy's "white room" vehicle, housing the shuttle change-out crew and flight surgeons, will move into place at the hatch once the orbiter is safed. When the crew opens the hatch, the changeout crew and flight surgeons will enter, Brown said. The CTV then will pull up behind the white room and extend a ramp to the orbiter.

Inside the CTV, the passenger seats have been removed and the interior remodeled to meet the unique needs of the returning astronauts. The CTV provides space for special equipment and for the CTV crew including space suit technicians, medical

Please see **TRANSPORT**, Page 4



NASA Photo

The new Crew Transport Vehicle, a renovated "people mover" acquired from the Baltimore airport, will allow a quicker departure from the orbiter after landing.

JSC

# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.

- General Cinema (valid for one year): \$4.
- AMC Theater (valid until May 1992): \$3.75.
- Loews Theater (valid for one year, can be used two weeks after premiere): \$4.
- Astroworld (valid 1991 season): season, \$44.94; child less than 4 feet, \$10.12; one day, \$15.85; Waterworld, \$8.15.
- Seaworld of Texas (valid 1991 season): child (3-11), \$12.25; adults, \$17.25.
- Six Flags (valid until Nov. 17, 1991): 1-day, 15.95; child less than 4-feet, 14.95; 2-day, 20.95.

JSC

# Gilruth Center News

**Defensive driving**—Course is offered from 8 a.m.-5 p.m., July 13, Aug. 10 or Sept. 21. Cost is \$15.

**Aerobic dance**—Eight-week session meets 5:15-6:15 p.m. Tuesday and Thursday nights. Cost is \$24.

**Exercise class**—Class meets 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

**Country and Western dance**—Six-weeks of Monday sessions begin June 17. Cost is \$20 per couple.

**Fiction workshop**—Six-week session begins June 26. Cost is \$80 per person.

**Scuba**—Four-week course meets from 6:30-9:30 p.m. Thursdays beginning June 6. Cost is \$50 deposit plus additional fees.

JSC

# Technical Library News

The following selections are now available in JSC's Technical Library, Bldg. 45, Rm. 100.

*Keeping Customers for Life.* Joan Koob Cannie, 1990. HF5415.5 .C36 1991.

*Cosmogenesis: The Growth of Order in the Universe.* David Layzer, 1990. QB981 .L33 1990.

*Practical Stress Analysis in Engineering Design.* Alexander Blake, c1990. TA648.3 .B57 1990.

*Online Searching for End Users: An Information Sourcebook.* Fred Batt, 1988. Z699.3 .B36 1988.

*Chemical Industries: An Information Sourcebook.* Phae H. Dorman, 1988. Z5521 .D65 1988.

JSC

# Swap Shop

## Property

Sale: Camino South, 3-2-2A, corner, new roof, brick, lg kitchen w/ island, oak cabinets, ceramic tile, lg satellite tile and patio w/retails, Jacuzzi in main bath. x33335 or 326-2582.

Rent/Lease: CLC condo on marina, three level, all appl, FPL, wet bar, 2-2-5-2. \$950/mo. 474-4922.

Sale: Cabin lot, Hilltop Lakes in Leon County, private airstrip, bass fishing, golf course, tennis, \$9500 OBO. 333-5177.

Sale: Egret Bay condo, 2-2-CP, all appl, waterfront, FPL, blinds, fan, patio, storage, pools, boat ramp, \$42.9K. x30092 or 481-3637.

Rent: Lake Travis cabin, private boat dock, CA/H, fully equip, accom 8, wkly/dly, \$425/\$85. 474-4922.

Sale: 25 acres near Alvin, 900' road frontage, barn, well, \$3600/ac. 585-8035.

Sale: CLC, two story condo 1-1.5-1-CP, FLP, all appl, alarm, fan, balcony, patio, \$38K, low paymts. 486-0508.

Sale: Friendswood custom 3-2-2D, lots of decking and trees, atrium, FPL, whirlpool, \$85K. 482-2138.

Sale: Friendswood/Wedgewood village, 3-2-2, new roof, lg rec rm, over 2000 sq ft \$63.9K. Jeff 482-5393 or 333-7010.

Sale: Meadowgreen, 3-2-2, custom drapes, many upgrades, \$128.9K 488-5109.

Lease: CLC, condo 2-1, FPL, all appl, mini blinds, swimming pools, vaulted ceilings, storage, W/D conn, \$475/mo. x31275 or 486-0315.

Sale: League City, 3-1-5-1, mini blinds, ceiling fan, fence, deck, ceramic floor, FPL, assume, no approval, \$59.5K. 554-7727.

Sale: Hangar, 2025 sq ft, 12' high bifold doors, 409 sq ft apt on top, Houston SW airport, all elec and plumbing, lot is 55' x 115', building and land, \$80K. 487-4705.

Rent: Condo 2-2, indoor W/D conn, FPL, res parking, nonsmoker, no pets, refrig, \$510/mo, avail June 1. x38889 or 480-1340.

Sale: Mobile home, 3-1.5, 14' x 66', good cond, new paint, carpet, appl, \$5K. 339-1957.

Sale: Bayou Vista lot on West Bay, good bulkhead, \$5.9K. 339-1957.

Lease or Sale: Baywind II condo, 1 BR, kitchen appl, util room, W/D conn, balcony, tennis, pool, avail June 10. 488-5019.

Sale: Pearland, lot, Dixie Hollow subdiv, concrete street, curbs, etc, all util. x39530.

Sale: Building in central Texas, 2-story, approx 10K sq ft, cash flow, reasonable 482-5003.

Lease: Camino So, 5-2-2, fenced backyard, ceiling fans, FPL, gas heat/water walk-in attic, \$825/mo plus dep, avail June 1. x36255 or 326-1414.

Lease: Nassau Bay, 4-2-2, park, no pets, 2 living areas, newly redecd, deck, 1.5 story, 2000 sq ft, \$890/mo. 333-6806 or 484-4944.

Rent: Galveston condo, furn, sleep six, Seawall Blvd and 61st St, cable TV, pools, wkly/wknd, daily, Magdi Yassa. x38470 or 486-0788.

Sale: Pipers Meadow, 3-2-5-2, formal LR/DR, FPL, loft, wet bar, fans, gar door opener, deck, landscaped, new paint. \$88K. Dennis, x34405 or 480-5076.

**Cars & Trucks**

'89 Cavalier, 2-dr, blue, 45K mi, cruise, tilt, auto, \$7K. x30328.

'87 Chrysler LeBaron, 4-dr, 2.5 eng, 4-cyl, ice blue, 41K mi, warr, loaded, good cond, \$6295. Sam, 488-9790.

'80 Honda Accord, 2-dr, gray, good cond, \$1200. x31883.

'90 Sunbird sun roof, tilt, AM/FM/cass, sporty, ex cond, \$9400 OBO. 280-2257.

'84 Nissan 300ZX 2+2, auto, A/C, stereo, \$5650; '80 Pontiac Phoenix V6, auto, A/C, stereo, \$1950. x30092 or 481-3637.

'77 Pontiac Grand Prix LJ, P/S, air, sun roof, 350 cu in V-8, new paint, leather seats, 104K mi, \$1500. x36604 or 482-1756.

'87 Chevy IROC-Z Camaro, loaded, T-Top, ex cond, low mi, auto, new tires, \$8900. 585-8932.

'83 Ford Country Squire S.W., good cond, BO. Dan, 481-3056.

'87 Camaro, auto, A/C, AM/FM stereo, ex cond, \$8000. 559-1491.

'89 Ford F150 Lariat, Super Cab, auto, A/C, P/L, tilt, cruise, camper top, towing pkg, capt chairs, ext warr, \$10,750. 585-8035.

'86 Dodge D-150 PU, 318 V-8, PS/PB, A/C, camper shell, AM/FM/cass, auto, low mi, \$5800. Matt, x34285 or 486-7260.

'82 Chrysler Cordoba, 33K mi, ex cond, \$3900. x37144 or 474-5610.

'78 Camaro, looks and runs good, \$1395. 333-8671 or 332-9105.

'85 Ford Tempo GL, 4-dr sedan, red/red, 34K mi, ex cond, \$3175. x33475 or 333-4722.

'84 Camaro, power, air, IROC access, metallic gray, 65K mi, \$3500. Rogers, x38851 or 944-7042.

'86 Hyundai Excel, 4-dr, htchbk, 96K mi, 5 spd, ex cond, \$2200. Noreen, x49702 or 486-5117.

'84 Ford Ranger PU, V6, std, A/C, camper cover, \$2200. x33849 or 991-5673.

'90 Toyota Tercel 2-dr sedan, teal, auto, loaded, tinted windows, ex cond. x30946.

'89 Nissan Maxima, 5 spd, burgandy ext, black int, loaded, CD, 27K mi, \$14K OBO. Gary, x36203.

'89 Ford Probe GT turbo, ex cond, many extras, \$10,895. Dan, 280-2780 or 457-2850.

'31 Model A Ford replica, like new, made '83 w/6000 mi, Mustang running gear, \$6800. (409) 948-0720.

'77 Chev Monte Carlo, 350 V-8, 116K mi, A/C, AM/FM/cass, new tires, new trans w/1yr warr, runs great, \$1200. OBO. Mark, x37491 or 335-1494.

'81 CJ5 Jeep Laredo, elec winch, P/S, A/C, 4-spd, hard and bikini top, \$5500. Jeff, x32283 or 489-9401.

'82 Chevy Suburban, Silverado, dual A/C, new trans, trlr pkg, 80K mi, \$3850. x30186.

'83 Ford F-150, short box, V-8, A/C, P/S, B/W, A/T, dual cruise, tilt, dual tanks, new tires ex cond, 73K, \$3500. 334-1303.

'76 Ford Granada, tan, good cond, \$575. OBO. 337-5976.

'85 Jeep CJ-7, red/blk hard top and bikini top, 6 cyl, 5 spd, A/C, P/S, AM/FM/cass, 59K mi, \$6500. 470-0777.

'72 Ford PU, parts for sale, fits '69-'72 models. 488-5019.

'89 Dodge Caravan, auto, A/C, cruise, ex cond, 27K mi, 770 warr, \$11,950. 992-4729.

'80 Fiat Spider convert, 61K mi, white w/blue int, new paint and tires, ex cond, \$3000. Mark, 474-2195.

'80 Toyota Celica ST, new paint, sun roof, ex cond, \$1650. 486-1888.

'87 Porsche Speedster kit car, high perf engine and trans, \$9,500. David, 332-9044 or 929-7120.

'78 VW Rabbit, auto, 4-dr, 150K mi, needs work, \$200 OBO. Nancy, x34356 or 488-4385.

'78 Triumph Spitfire convert, 43K mi, looks good, runs good, \$2K. 332-7657.

'80 Honda Accord, 2-dr, gray, good cond, \$1100. x31883.

'88 Chevrolet Caprice, ex cond, well maint, high mi, all highway, \$2800. 488-7728.

'88 Mitsubishi Precis, 5 spd, 3-dr, AM/FM/cass, new tires, 30 mpg, very dep, \$3500. 333-7070 or 482-2342.

'68 Dodge Dart, 170 slant six, P/S, A/T, new tires, rebuilt eng, new starter, good cond, \$400. OBO. 280-2510 or 486-4439.

**Cycles**

'85 Honda, sell for parts, no title, runs good, mech perfect, \$400. x30328.

'88 Suzuki RM-125, like new, ex cond, low hrs, \$1400. Jack, x39382 or 331-6659.

Honda 80XL off-road, \$200. 992-2827.

'76 Moto Guzzi 850T, V-twin, shaft drive, \$1195. 992-4942.

'84 Kawasaki GPZ 750, 8.5K mi, ex cond, \$2000. Shannon, x32646 or 484-5412.

Raleigh Tri-Lite 12-spd, 19" bike, indexed gears, puncture resistant Kevlar tires, plus orig tires, aero bars, red, ex cond, was \$425 new, now \$250 OBO. x49755 or 335-1862.

**Boats and Planes**

'84 Century Mustang 195, 19.5'. Bowrider, Mercruiser I/O, SS Prop, galv trlr, low hrs, \$4200.

JSC

## Today

**SETS '91 seminar**—The Science, Engineering, Technology Seminar will present open a program at 2 p.m. May 24-27 at the Adam's Mark in Houston. JSC Center Director Aaron Cohen and astronaut Franklin Chang-Diaz will be the keynote speakers. For more information contact Sylvia Hu x34254.

**Cafeteria menu**—Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp. Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

## Monday

**Memorial Day**—Most JSC offices will be closed May 27 in observance of the Memorial Day holiday.

## Tuesday

**BAPCO meets**—The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m. May 28 at the League City Bank and Trust. For more information contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

**Cafeteria menu**—Special: pepper steak. Entrees: fried shrimp, pork chop with applesauce, turkey a la king. Soup: celery. Vegetables: au gratin potatoes, breaded squash, buttered spinach.

## Wednesday

**SCSBA meets**—The Society for Computer Simulation Bay Area/Houston Chapter will meet at 11:45 a.m. May 30 in Lockheed Plaza 3, first floor PIC Rm. Gerald J. Moorman, Lockheed, will speak about "Total Quality Management in the Field of Simulation."

**AFCEA meeting**—The Air Force Space Command at Peterson Air Force Base meeting will be held at 11:30 a.m. May 29 at the Lakewood Yacht Club. Tickets are \$12 for members and \$14 for non-members, including lunch. Contact Veronica Mullins or Tammy Williams, 283-7342, by May 24 for reservations.

**Astronomy seminar**—The JSC Astronomy seminar will be at noon May 29 in Bldg. 31, Rm. 129. Dr. J. Taylor, Princeton, will speak on timing binary pulsars. For more information contact Al Jackson 333-7679.

**Cafeteria menu**—Special: Mexican dinner. Entrees: fried catfish with hush puppies, braised beef ribs. Soup: seafood gumbo. Vegetables: Spanish rice, ranch beans, buttered peas.

## Thursday

**JSC ARC meeting**—The JSC Amateur Radio Club will meet at noon May 30 in Bldg. 16, Rm. 253. This month's program will be a review of the STS-35 and STS-37 Shuttle Amateur Radio Experiment (SAREX) results and future SAREX activities. For more information contact Dale Martin, x37740.

**Cafeteria menu**—Special: hamburger steak with onion gravy. Entrees: corned beef with cabbage and new potatoes, chicken and dumplings, tamales with chili. Soup: split pea. Vegetables: navy beans, buttered cabbage, green beans.

## May 31

**Cafeteria menu**—Special: barbecue link. Entrees: deviled crabs,

broiled codfish, liver and onions. Soup: seafood gumbo. Vegetables: buttered corn, green beans, new potatoes.

## June 2

**LDEF symposium**—NASA will sponsor the first Long Duration Exposure Facility post-retrieval symposium June 2-8 at the Hyatt Orlando Hotel in Kissimmee, Fla. This is the first of three planned symposiums involving the dissemination of LDEF data with team members and the international community. For more information contact Arlene Levine at (804) 864-3782.

## June 3

**JSC clinic**—The JSC Clinic will offer total blood cholesterol counts and blood pressure screenings the week of June 3-7 at various locations around the center. For more information or times contact the clinic x34111.

## June 4

**Inventor's luncheon**—The JSC Inventor's Luncheon will be at noon June 4 at the Gilruth Center, Rm. 216. The luncheon is honoring JSC employees whose NASA patents were issued in 1990. For more information contact the JSC Office of Patent Counsel x31012.

## June 5

**Astronomy seminar**—The JSC Astronomy seminar will be held at noon June 5 in Bldg. 31, Rm. 129. This will be an open discussion meeting. For more information contact Al Jackson 333-7679.

George, x31852.

Sunfish sailboat and trlr, fair cond, good sails; wooden motor boat and trlr, no motor, good cond, \$200 for both. x33335 or 326-2582.

Boat slip on Clear Lake w/roof and motorized boat hoist for power boats, great access to the water, \$125/mo. 474-4922.

Quachita 15' alum fishing boat w/Johnson 4 hp motor and trlr, \$700 OBO. 282-3261.

'83 Renken 18' sailboat, roller furling jib, 4 hp aux, galv trlr, sleeps 4, good cond, \$4000. 339-3476.

Aircraft propeller-Sensenich 74DM6-0-58, overhauled and yellow tagged, fits some Beech, Piper PA-18, PA-22, PA-28 series aircraft. 283-5327.

15' Sooner Craft, Tri-Headron, walk-tru windshield and canopy, 85 hp, trim, Johnson O/B, Dilly tilt-trlr, \$1600. 332-1336.

**Audiovisual & Computers**

Realistic mini cass recorder/player w/110v pwr supply, \$15; Realistic stereo tape control center, records/monitors up to 3 decks, \$10. Ronnie, x32539 or 538-1649.

Panasonic port stereo cass player, mini speakers and AC adapter, \$35. Ron, x30887.

Two, 5-1/4" diskette storage boxes, 50 blank diskettes, 4 games for IBM or clone, incl Top Gun, ProWler, Karateka and Harrier, BO. Ron, x30887.

Macintosh SE/30, 5MB RAM, 40MB HD, keyboard and SW, incl math. Dave, 282-6785 or 480-9848.

Zenith Supersport laptop computer, 9MHz 8088, 20MB HD, 3-1/5 diskette, carrying case, \$900. Jay, 485-1377.

HP12C financial calculator, new, warr, \$60. Todd, x31491 or 946-4670.

8-channel stereo mixer (KMD Mc-802), less than 2 yrs old, incl custom protective case, ex cond, \$500. 523-3515.

Panasonic VCR w/remote control, future recording, and more. \$125. 339-1337.

Apple II+ w/80-cd card, green mono monitor, 5-1/4", Olivetti PR2300 Ink-Jet, ile w/green mono monitor, 5-1/4", assorted SW, \$600 OBO. Brantley, 331-0361.

Commodore 128D w/built in 1571 FD, Commodore 1526 printer, Roland DG color monitor, modem, manuals, SW, warr, \$450. John, x38429 or 482-6536.

TASCAM home recording studio, 8 track recorder, M-30 mixer, plus 4 DBX 150's, \$3500; rack stand, \$75; Fender blue Fender guitar w/case, American made, \$300. Ron, 474-3612.

Macintosh Plus multi-tasking, 4MB RAM, 800K FD, SW, new, \$750. 280-8796 or 283-5471.

Cerwin-Vega HED-15 high efficiency speakers, 100W, \$250, OBO. Steve, 282-4108 or 333-3176.

**Musical Instruments**

Hammond Spinnet organ, M series, \$500. 480-4035.

Wurlitzer piano console, ex cond, \$450. 420-1987.

**Pets & Livestock**

Cockatiels, hand-fed. Linda, 484-7834.

Rottweiler puppies, born May 2, parents on premises, AKC reg, BO. 337-3122.

Free kittens, Good w/children and other pets. 482-9407.

AKC reg yellow Lab puppies, \$250. Mary Anne, x34413 or Rob, 280-8125.

**Household**

Queen sz, semi motionless water bed w/heater, fill/drain kit/liner, \$85. 486-2414.

25" color tv, console \$150; 2 glass top end tables, \$80 ea; glass top coffee table, \$75; Sears rower/exerciser, \$75. 482-7607.

Mediterranean Motorola music center, cabinet solid state w/color tv screen and record player, \$195, water bed (single), wicker chairs, \$125, 3 Persian carpets, \$290. 280-5801.

GE space saver microwave, blk, was \$449, now \$275. 339-1337.

19" Samsung color TV, remote, ex cond, \$100. Greg, 333-7160 or 488-5015.

Couch, chair w/ottoman, brown vinyl, good cond, \$225; beige curtains, 1pr, good cond, \$30. 480-6539.

Kelvinator upright freezer, 14 cu ft, \$100; rear & side window louvers for '79 Mazda RX7, \$50; Bassett triple dresser w/hutch mirror and matching night stand \$300, all ex cond. 488-5218.

Formal sofa and loveseat, cream w/mauve/seafoam, 8 mos old, was \$1600, now \$750 OBO. 482-5462.

# Answering Questions

## Spacelab Life Sciences-1 to explore capabilities of humans in space

[Editor's note: This is the second of two articles discussing the wide range of human experiments on the STS-40 Spacelab Life Sciences-1 mission. Part one was published in the May 17 issue of the Space News Roundup.]

By Kari Fluegel

Old questions could find new answers, and space medical textbooks could be rewritten following the unprecedented survey of the human body in space during STS-40.

Spacelab Life Sciences-1 is the first space shuttle mission dedicated solely to life sciences research. With the help of the seven-member crew, the 18 investigations will study the cardiovascular, cardiopulmonary, musculoskeletal, immunological, metabolic and neurovestibular systems.

Dr. Howard Schneider, SLS-1 mission scientist in JSC's Space and Life Sciences Directorate, said these are the systems that display the most pronounced changes in space flight, but with the sophistication of the spacelab, other phenomena may be found.

"We hope to get some answers to questions not yet answered," Schneider said, "and to understand the basic physiological response to the zero-gravity environment, so we can establish countermeasures to assure the health and well being of flight crews on longer missions."

Of the 18 experiments, 10 will be conducted on crew members and are managed by JSC. Five of those experiments are:

### Experiment 072

The joint U.S./Canadian research program of "Vestibular Experiments in Spacelab" represents a group of closely related experiments designed to investigate space motion sickness, any associated changes in inner ear vestibular func-

tion during weightlessness and the impact of those changes postflight.

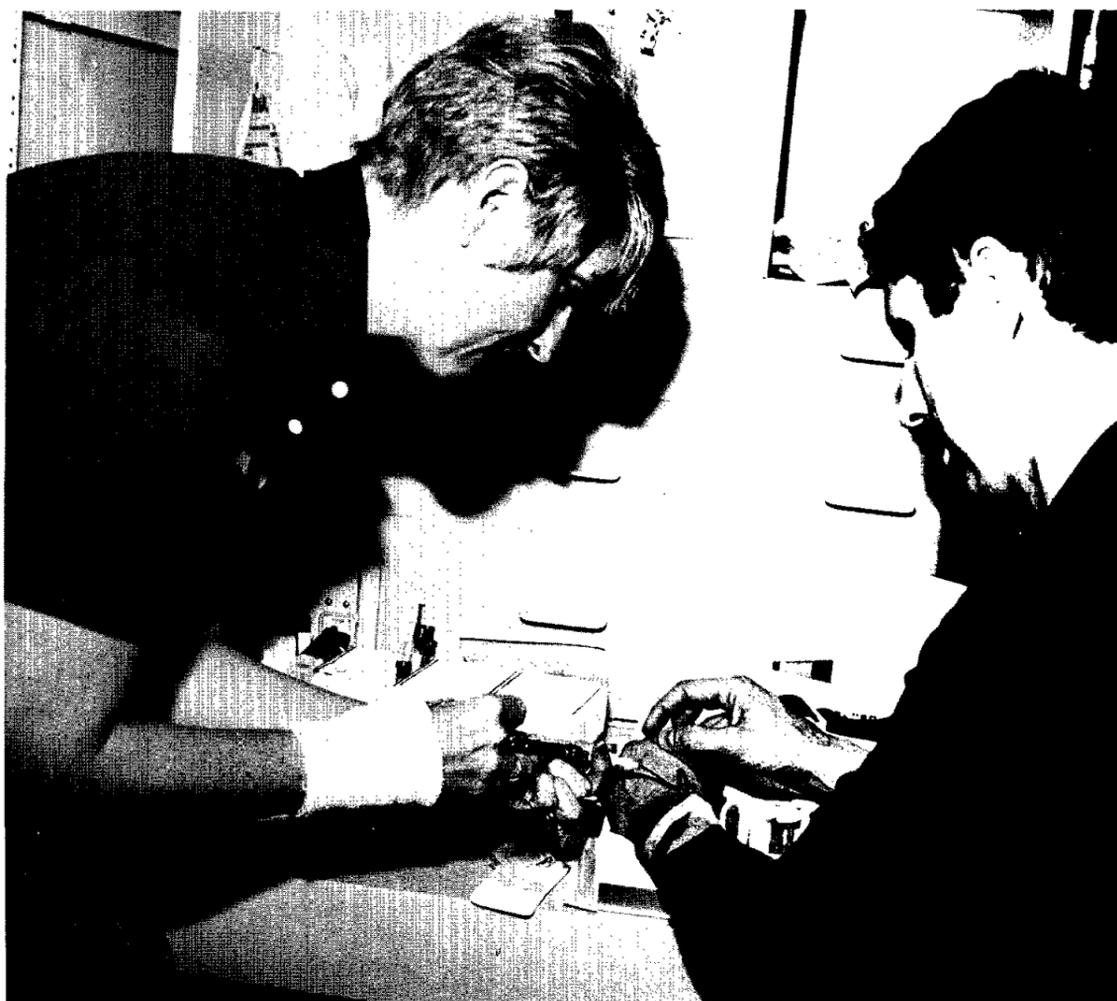
The team will study the interaction between conflicting visual, vestibular and tactile information. Investigators expect crew members to become increasingly dependent on visual and tactile cues for spatial orientation. The test calls for crew members to place their heads in a rotating dome display to induce a sensation of self-rotation in the direction opposite to the dome rotation. The astronaut will then move a joy stick to indicate the perception of self-motion.

Awareness of position by astronauts is important for reaching tasks especially during landing operations. The objective of several tests during the flight is to document the loss of sense of orientation and limb position in the absence of visual cues and to determine what mechanisms underlie the phenomenon. Crew members will view several targets placed about the interior of Spacelab. They then will be blindfolded and asked to describe the position of their limbs in reference to their torsos and to point to the targets.

Experiment 072 also will examine the causes and treatment of space motion sickness and evaluate the success of Earth-based tests to predict susceptibility. Two crew members will wear an Acceleration Recording Unit to measure all head movement. The time, course and signs of motion sickness will be recorded. Subjects wearing the ARU will don the collar for several hours during the mission and, if desired, when symptoms occur. The influence of the collar on the resulting head movement pattern and symptoms will be monitored.

Another battery of tests performed preflight will attempt to determine which test or combination of tests could aid in predicting space motion sickness.

The leader of Experiment 072 is Dr. Laurence R. Young, professor of aeronautics and astronautics and director of the Man-Vehicle Laboratory at the



Massachusetts Institute of Technology.

### Experiment 120

A study headed by Dr. T. Peter Stein of the University of Medicine and Dentistry of New Jersey involves several tests looking at the mechanisms involved in protein metabolism including changes in protein synthesis rates, muscle breakdown rates and usage of dietary nitrogen in a weightless environment.

"Protein Metabolism During Space Flight" will examine whole body protein metabolism by measuring the uptake of  $N^{15}$ -glycine, an amino acid in protein, in saliva and urine samples from crew members preflight, inflight and postflight.

Crew members will collect urine samples throughout the flight. On the second and eighth flight days, astronauts also will take oral doses of  $N^{15}$ -glycine. Crew members will collect and freeze a urine sample 10 hours after the ingestion of the glycine for postflight analyses. Urinary 3-methyl histidine, a marker for muscle protein breakdown also will be monitored.

Stein is a professor of surgery at the University of Medicine and Dentistry of New Jersey, School of Osteopathic Medicine, Camden, N.J. He also teaches at Rutgers University in New Brunswick.

### Experiment 240

Following on investigations during Spacelab 1 and the German D-1 shuttle missions, "Lymphocyte Proliferation in Weightlessness," will investigate the effect of weightlessness on the activation of lymphocyte reproduction. The experiment also will test if there is a possible alteration of the cells responsible for part of the immune defense system during long-duration space flight.

STS-40 will repeat the basic Spacelab-1 experiment. Lymphocytes will be purified from human blood collected a few hours before launch. The cells will be resuspended in a culture medium, sealed in culture blocks and stowed on

Columbia's middeck. Inflight, the samples will be exposed to a natural chemical that induces cell division and allowed to grow in the weightless environment. Some of the samples also will be exposed to varying gravity levels on the low-gravity centrifuge. These samples will serve as a control group as they will experience the same environmental conditions with the exception of weightlessness.

The stimulation of the lymphocytes to reproduce is determined by monitoring the incorporation of a chemical isotope tracer into the cells' DNA. Investigators will gather further information on lymphocytes from blood samples taken from the crew inflight.

Principal investigator for Experiment 240 is Dr. Augusto Cogoli, director of the Space Biology Group at the Institute of Biotechnology of the Swiss Federal Institute of Technology at Zurich, Switzerland.

### Experiment 261

A most consistent finding from space flight is the decrease in circulating red blood cells and subsequent reduction in the oxygen carrying capacity of the blood.

Experiment 261, "Influence of Space Flight on Erythrokinetics in Man," studies the mechanisms that may be responsible for this decrease, including the effect of space flight on red blood cell production rates and the role of changes in body weight and plasma volume in red blood cell production.

Blood samples taken preflight, inflight and postflight will trace the life of astronauts' red blood cells. By measuring red blood cells and plasma, researchers will check the rate of production and destruction of blood in both normal and microgravity conditions.

On flight day two, crew members will receive an injection of a tracer that will measure the amount of new red blood cells. Tracers injected before launch will measure the destruction rate of red blood

cells. Crew members will draw blood samples on the second, third, fourth, eighth and ninth days of flight.

The principal investigator is Dr. Clarence Alfrey, professor of medicine in hematology at Baylor College of Medicine in Houston.

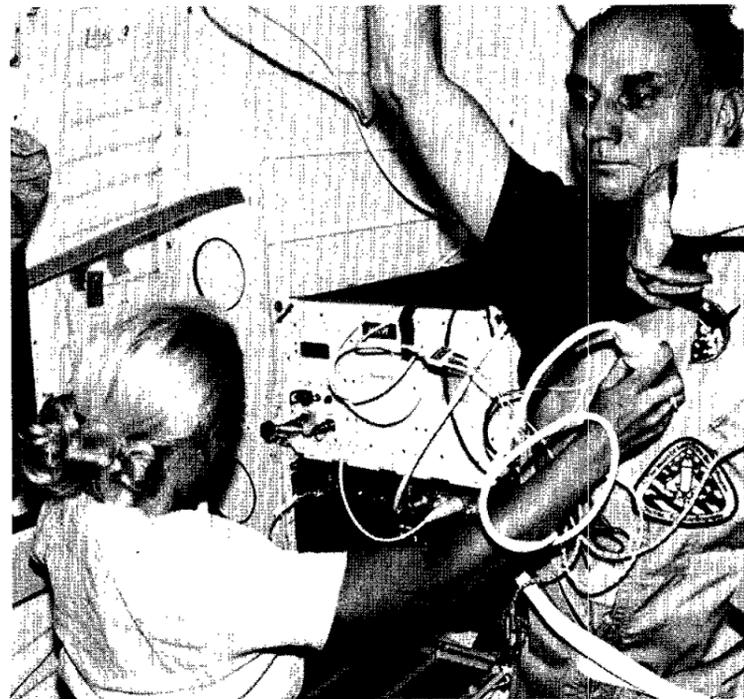
### Experiment 305

Changes in calcium balance during space flight are of concern to researchers since the changes appear to be similar to those observed in humans with osteoporosis, a condition in which bone mass decreases and the bones become porous and brittle. Because of potential health problems for astronauts returning to gravity after long space flights, the mechanisms that cause these changes are of great interest in space medicine.

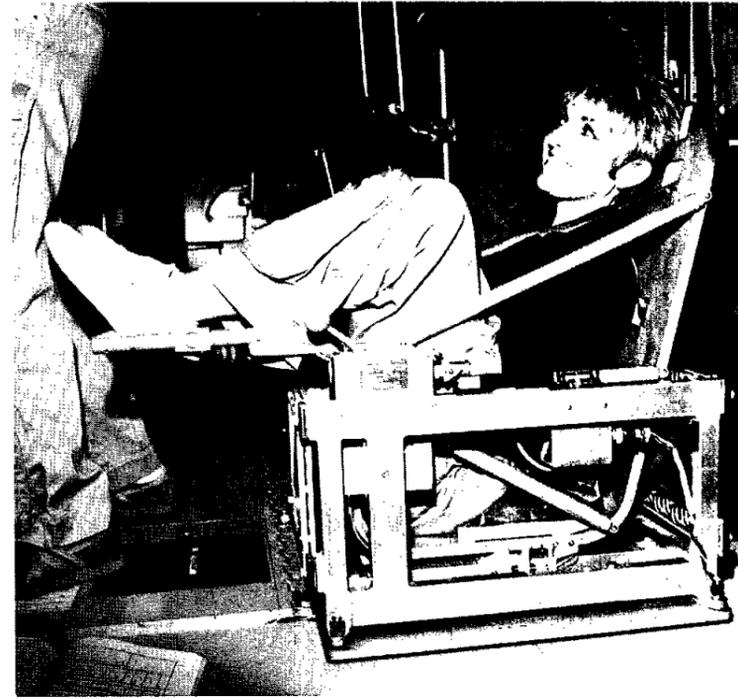
Experiment 305, "Pathophysiology of Mineral Loss During Space Flight," will measure the changes that occur during space flight in circulating levels of calcium-metabolizing hormones and the uptake and release of calcium in the body. Investigators believe there may be significant changes in the amount of these hormones produced due to an increase in the breakdown and reabsorption of bone tissue and that these changes begin to occur within hours after entering the weightless environment.

Crew members will determine their body mass daily and will keep a log of all food, fluids and medications ingested. They also will draw blood samples on selected days to determine the role of calcium regulating hormones on the observed changes in calcium homeostasis. The experiment is repeated on selected days preflight and postflight. A simultaneous ground experiment is performed using non-crew member subjects.

Principal investigator is Dr. Claude Arnaud, professor of medicine and physiology at the University of California at San Francisco.



Top: Several of the SLS-1 experiments require blood and urine samples from the crew. Payload specialists Millie Hughes-Fulford and Drew Gaffney practice blood drawing procedures to be used during the nine-day mission. Left: On STS-51D, SLS-1 Mission Specialist Rhea Seddon used a sonar sensor to produce an image of Sen. Jake Garn's heart on the echocardiograph screen. A similar technique will be used on STS-40. Right: During the mission, STS-40 crewmembers will keep a record of all foods and medications ingested and will determine their body masses daily. Mission Specialist Millie Hughes-Fulford tests the body mass measuring device which swings back and forth, recording how much the crew member's mass retards the chair's movement.



## Payloads, flight activities hang STS-39 plaque

Mark Kirasich, lead payloads officer, and Neil Woodbury, lead flight activities officer, earned the honor of hanging the STS-39 plaque in Mission Control.

Lead Flight Director Ron Dittmore said the pair accepted the honor on behalf of their teams. The payloads team, he said, had worked on the mission for years, and the flight activities team spent thousands of hours preparing for the complex flight plan.

"They were the major players as far as what we needed to replan, how we would do it and making sure it all came out in a satisfactory manner," Dittmore said. "We couldn't have done it without those guys."

## NASA selects data processing contractors

NASA recently announced the selections of two companies for negotiation leading to two contract awards for operational and institutional data processing.

IBM Federal Sector Division of Houston was selected for negotiations on a 13-year contract for Operational Automatic Data Processing, while PacificCorp Capital Inc. of Reston, Va., will enter into negotiations for an Institutional Automatic Data Processing contract.

The OADP contract will provide as many as 48 ground-based mission operations main frame computer systems, peripheral equipment and services to be used in the development of the Space Station Mission Control Center and the Space Station Training Facility. Additionally, the systems will be used in upgrading the Mission Control Center and Shuttle Mission Training Facility.

The OADP contract also will provide ground-based computer systems for future, yet unspecified, programs at JSC and other NASA centers.

During the initial eight-year period covered by the OADP contract, the U.S. Government will be able to issue delivery orders for hardware, system software, services and maintenance up to maximum quantities specified in the contract. The five additional one-year options may be used only for the purchase of maintenance for hardware and system software acquired under the proposed contract.

Because of its indefinite delivery/indefinite quantity feature, the value of the OADP contract will depend upon the number and type of systems, equipment, and services ordered under the contract. It is anticipated that about \$191 million in delivery orders may be issued during the 13-year contract period. However, that amount may increase, depending upon future requirements.

The IADP contract will support JSC and White Sands Test Facility by providing IBM-compatible central processing unit subsystems, direct access storage device subsystems, cartridge tape drive subsystems, and front end processor subsystems.

The IADP support services will include maintenance, initial systems engineering support, per-call systems engineering support, operator training, documentation, and facilities and resources for benchmarking activities.

Amdahl Corporation of Washington, D.C. and Memorex Telex of Vienna, Va. were proposed as sub-contractors with PacificCorp Capital Inc.

IADP will provide IBM plug-compatible systems for JSC and WSTF for five years. Maintenance on these systems would continue for an additional five years for systems procured in the second through fifth years of the contract.

Like the operations contract, the value of the IADP contract will depend on the number and type of systems, equipment, and services NASA will order under the contract. It is anticipated that about \$54 million in delivery orders may be issued during the 10-year contract period. However, that amount may increase, depending on future requirements.

JSC

## People

### Lulla earns society's presidential citation

Kamlesh Lulla of JSC's Flight Science Support Office, was granted the "Presidential Citation Award" by the American Society for Photogrammetry and Remote Sensing.

Lulla received the award for his work as guest editor of the Geographic Information Systems and Remote Sensing issue of the journal "Photogrammetric Engineer-

ing and Remote Sensing."

### Gailey top secretary

Terry A. Gailey, a secretary in Engineering's Flight Data Systems Division, recently received the Marilyn J. Bocking Award for Secretarial Excellence.

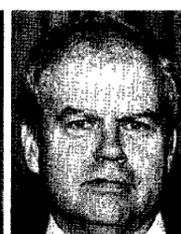
Gailey, who became division staff secretary when the division was created in April 1990, was cited for establishing procedures for the fledgling division and coordinating working relationships of people who previously were part of three different



Kirasich



Woodbury



O'Neill



Lulla



Gailey

organizations with differing cultures. The Certified Professional Secretary received a plaque from JSC Director Aaron Cohen, and a \$500 stipend.

### O'Neill distinguished Nebraska alumna

John O'Neill, deputy director of

Mission Operations, recently was named a distinguished alumna of the University of Nebraska in Lincoln.

O'Neill, who received a bachelor's degree in mechanical engineering from Nebraska in 1960, was honored for his contributions to America's manned space flight program.

The honor was presented at a ceremony May 4.



JSC Photo by Benny Benavides

Louise Kitchen, a senior systems analyst for Unisys, presents a bouquet of yellow roses to Queen Elizabeth II.

## Queen receives red carpet welcome at space center

(Continued from Page 1) miniature replica of "Opening the Space Frontier — The Next Giant Step," the mural on permanent display in the visitor center.

Following the luncheon with 300 invited Houston community and industry leaders, the queen and duke received several technical demonstrations. Guiding the royal couple was Astronaut Mike Foale, who has dual U.S.-Great Britain citizenship.

Larry Li, an aerospace engineer in the Automation and Robotics Division, demonstrated the Extravehicular Activity Retriever and robotic hand and gripper. Ann Murray, also an aerospace engineer, demonstrated the robotic torso, while Jim McBarron, chief of the EVA Branch, discussed EVA suit

equipment with the royal couple.

Dr. Charles Bourland, subsystem manager of Space Station food, discussed space food and offered the queen and duke samples of the candy carried on the orbiter.

During the demonstrations, the queen inquired why food doesn't float off the plate and how EVA crewmembers see through the suit's gold-plated visor, while Prince Philip took the opportunity to try out EVA gloves in a glove box.

In MCC, Astronaut Jeff Hoffman, whose wife Barbara is a British citizen, escorted the queen into the Flight Control Room and discussed mission operations. The queen also was introduced to Chief of the Flight Director Office Randy Stone, Flight Director Jeff Bantle and Astronaut Bob Cabana.

## Transport vehicle gets crew out more quickly

(Continued from Page 1) personnel and a driver. The vehicle will be maintained along with other convoy vehicles at Dryden.

Brown added that because of its past use as an airport vehicle, the CTV has a number of safety provisions installed to meet Federal Aviation Administration safety guidelines.

For STS-40, which is dedicated to the exploration of the human body's reaction in space, the ability to get information immediately after flight enhances the investigations done on orbit before the crew readapts to the

presence of gravity, Brown said.

While NASA acquired the CTV principally to provide more efficient egress from the shuttle, the CTV also provides the capability of gathering more time-critical information about the effects of longer-duration space flights, he said.

"When NASA decided to try to extend shuttle mission durations, a medical investigation project was initiated to both assess the risks of longer exposure to microgravity and develop some inflight countermeasures to enhance readaptation," Brown said.

## Bond campaign concludes May 31

JSC employees have one more week to participate in the 1991 U.S. Savings Bond Campaign.

"I encourage all JSC employees to support the Center's activities surrounding this effort," said Director Aaron Cohen. "The purchase of savings bonds is important both to the well-being of the

nation's economy and to the personal savings programs of individuals."

NASA's goal for this year's campaign, which ends May 31, is 10 percent participation. JSC's goal, however, is 49 percent participation, said Teresa Sullivan, the center's campaign coordinator.

## Robotics division sees reorganization

By Pam Alloway

Engineering's Automation and Robotics Division recently underwent a reorganization that managers believe will more efficiently meet the organization's goals.

The most recent reassignments are a continuation of the reorganization effort that occurred throughout the Engineering Directorate last year.

The most recent action includes both organizational changes and personnel reassignments. Managers said the purpose of the reorganization was to improve communication and working relationships with outside customer organizations, to effectively consolidate internal functions, to foster a team approach and to minimize shared responsibilities across various areas.

The Automation and Robotics Division is a new group formed last year from elements in 11 different organizations scattered throughout the center, said Norman Chaffee, recently appointed division deputy chief. The intent was to consolidate all the artificial intelligence and robotics work into one organization.

Walt Guy, formerly the chief of Engineering's Crew and Thermal Systems Division, was appointed chief of the new automation division.

In the reorganized division, the Flight Robotic Systems Branch will

be responsible for all space shuttle and Space Station Freedom robotics support such as subsystem management, system analysis, design and integration.

The Robotic Systems Technology Branch will be responsible for robotic activities for all advanced programs and technology development, and will consist of two sections: the Robotic Applications Labs, which will provide and manage all division laboratory resources except the Space Systems Automated Integration and Assembly Facility; and the Robotic Development Section, which will lead and staff all robotics technology development and transfer efforts.

The Automated Robotics Section was renamed the Robotic Intelligence Section and will continue to be responsible for all major robotic software development within the division.

"This reorganization was done after we've had time to determine what our strengths are and who our customers are," Chaffee said. "We've refocused, reassigned and realigned. We think it's going to work very well, but flexibility is the name of the game."

There are about 75 people in the division and about one-third of them will be affected by this latest reorganization effort, Chaffee said.

## JSC experts help with TV movie

When the television movie "Plymouth" airs Sunday night, its accuracy will be due in part to the efforts of JSC employees.

Technical advisers for the movie, which tells the story of the first town on the Moon, included Mark Craig, manager of the Lunar and Mars Exploration Program Office, and Wendell Mendell and Mark Cintala of JSC's Solar System Exploration Division.

The movie, starring Cindy Pickett, is scheduled to air at 8 p.m. Sunday on Channel 13.

## ISD hosts Computer Expo '91

More than 50 vendors will display mainframe and personal computer hardware and software at the Information Systems Directorate's Computer Expo '91 Thursday at Gilruth Center.

The expo will run from 8 a.m. to 5 p.m.

Classes and demonstrations will include Symantec on window products, On Target and Just Write, 8:30-9:30 a.m., Room 204; Xerox and Open Systems by Xerox from 10-11 a.m., Room 204; Technical Information Management by Intergraph Corp., 10-11 a.m., Room 206; new features of WordPerfect 5.1, introduction of LetterPerfect and a question and answer session on WordPerfect for Windows by WordPerfect Corp., 1-2 p.m., Room 206; and Using HiQ by Bimillennium to solve and analyze engineering and scientific problems, 2:30-3:30 p.m., Room 204.

Knowledgeware Inc. will present Computer Aided Software Engineering Tools to include planning

analysis design construction, documentation and rapid application development at 8:30-9:30 a.m. in Room 206.

Also, KI Research will discuss Kinet, which allows more than 40 different Unix platforms to participate as members of Decnet Maintenance Operational Protocol and Local Area Transfer terminal server network from 1-2 p.m. in Room 204.

Software AG Federal Systems Inc. will cover tactical and strategic directions of Software AG Case products which provide automated support for application development activities throughout the software development life cycle. The products which will be covered in detail are NATURAL Architect Workstation for analysis and design, NATURAL Construct for application generation and PRE-DICT CASE for comprehensive integrated CASE environment. The presentation will be from 2:30 to 3:30 p.m. in Room 206. NASA-JSC

## Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Editor ..... Kelly Humphries

Associate Editors ..... Pam Alloway  
Kari Fluegel